

THE CLAIMS

What is claimed is:

1 1. A TiW-selective composition comprising water and between about 5% and
2 about 20% by weight of periodic acid, wherein the composition is effective in removing a
3 TiW alloy and removing residues of etching of TiW alloy while removing a relatively small
4 amount of Al, Cu, or an AlCu alloy, and wherein the pH of the composition is less than 7.

1 2. The composition of claim 1, wherein the composition is substantially free of
2 hydrofluoric acid.

1 3. The composition of claim 1, wherein the pH of the composition is less than
2 about 4.

1 4. The composition of claim 1, wherein the pH of the composition is less than
2 about 2.

1 5. The composition of claim 1, wherein the composition contains periodic acid in
2 an amount from about 7.5% to about 15% by weight of the composition.

1 6. The composition of claim 1, wherein the composition contains periodic acid in
2 an amount from about 8% to about 12% by weight of the composition.

1 7. The composition of claim 1, wherein the composition contains periodic acid in
2 an amount of about 10 % by weight of the composition.

1 8. A method of etching and cleaning a TiW alloy layer comprising:
2 providing a substrate comprising an exposed TiW alloy layer;
3 etching the TiW alloy by a method which results in formation of etching
4 residue;

5 contacting the substrate with the composition of claim 1 for a time and at a
6 temperature sufficient to cause the composition to remove at least a portion of the TiW alloy
7 and substantially all of the etching residue from the substrate; and
8 rinsing the substrate.

1 9. The method of claim 8, wherein the substrate further comprises an exposed
2 AlCu alloy, wherein the specificity of removal of TiW to AlCu, in terms of etch rate, is at
3 least about 3.

1 10. The method of claim 9, wherein the substrate further comprises an exposed
2 AlCu alloy, wherein the specificity of removal of TiW to AlCu, in terms of etch rate, is at
3 least about 5.

1 11. The method of claim 10, wherein the substrate further comprises an exposed
2 AlCu alloy, wherein the specificity of removal of TiW to AlCu, in terms of etch rate, is at
3 least about 7.

1 12. The method of claim 8, wherein the temperature at which the solution is used
2 ranges from about 20°C to about 100°C.

1 13. The method of claim 8, wherein the temperature at which the solution is used
2 ranges from about 30°C to about 40°C.

1 14. A method of etching and cleaning TiW layer comprising:
2 providing a substrate comprising a TiW alloy layer and etching residues from
3 prior etching of the TiW layer;
4 contacting the substrate with a solution containing hydrogen peroxide for a
5 time and at a temperature sufficient to cause the solution to substantially remove exposed
6 TiW alloy;

7 contacting the substrate with the composition of claim 1 for a time and at a
8 temperature sufficient to substantially remove the residues from the substrate; and
9 rinsing the substrate.

1 15. The method of claim 14, wherein the temperature at which the solution is used
2 ranges from about 20°C to about 100°C.

1 16. The method of claim 15, wherein the temperature at which the solution is used
2 ranges from about 30°C to about 40°C.